

# **Summary of the San Francisco to San Jose Preliminary Alternatives Analysis Report**

## **S.1 Results from the Preliminary Alternatives Analysis**

The Preliminary Alternatives Analysis report and its associated engineering and environmental analysis reconfirms that a four track, grade separated, shared Caltrain and High-Speed Train (HST) system is feasible and the preferred HST alternative between San Francisco and San Jose on the Peninsula (see Figure S-1). It also confirms that such a system between San Francisco and San Jose can be built at costs that are in the range of what has been presented in the 2009 Business Plan and in previous Program Level environmental documents.

Since 1996 the Peninsula Corridor Joint Powers Board (PCJPB or Caltrain) has endorsed HST in concept and has adopted multiple resolutions expressing such support. Since 2004, the PCJPB and the California High Speed Rail Authority (Authority) have worked in a partnership to develop the Caltrain corridor into a 21<sup>st</sup> century railroad capable of serving both commuter and HST for the Peninsula and California. This partnership is founded on the basis that there are considerable efficiencies and synergies between the two rail services. This alignment alternative would increase intercity connectivity and accessibility to San Francisco, the Peninsula, and SFO, while improving the safety, reliability, and performance of the regional Caltrain commuter service. The Caltrain corridor shared-use option would take advantage of the existing rail infrastructure and would maximize the opportunity to provide rail service at-grade where possible. Environmental impacts would be minimized since this alignment utilizes the existing Caltrain right-of-way. In addition, the Caltrain shared use corridor would provide safety and traffic benefits by grade-separating existing at-grade roadway crossings. For these reasons, the Caltrain shared use corridor is the preferred alignment for HST service between San Francisco and San Jose.

The entire alignment will be a predominantly four track, grade separated railroad and would allow both Caltrain and HST to operate their respective services. It would be a shared track system with HST operating at speeds up to 125 mph and Caltrain up to 110 mph.

The HST stations recommended for continued study are:

**Downtown San Francisco:** A joint terminal solution for downtown San Francisco at the Transbay Transit Center and 4<sup>th</sup> and King.

**San Francisco Airport Connector Station:** Millbrae (SFO).

**A Potential Mid-Peninsula Station:** Redwood City, Palo Alto and Mountain View Caltrain stations are currently under consideration. One or none of these potential station locations could be selected to be part of the HST system.

**Downtown San Jose Terminus:** Diridon Station.

The Authority, the FRA and Caltrain, in addition to performing engineering and environmental analysis, have engaged the public and the communities on the Peninsula and are incorporating their input from San Francisco to San Jose. The observations below outline some of the highlights from the work and input received to-date:

- In San Francisco the analysis supports focusing Authority, FRA and Caltrain engineering and study efforts on a joint terminal solution for downtown San Francisco at the Transbay Transit Center and 4<sup>th</sup> and King. This is consistent with the City of San Francisco's and the Transbay Joint Powers Authority's plans and policies, and is a workable solution for the HST and Caltrain services.
- On the Peninsula, the Authority, FRA and Caltrain will limit the use of high berms in commercial or residential areas where they would significantly reduce connectivity and mobility or where there is strong local opposition to this type of structure.
- Tunnel options for Caltrain, HST or both have been added for further evaluation in sections throughout the corridor. This was, in some cases, in direct response to suggestions from local communities.
- At the request of the City of Mountain View the Authority is considering the current Caltrain Mountain View station as an additional potential HST station.

For the detailed evaluation of alternatives, the three basic vertical options of elevated, at-grade and below grade have been expanded to six options to better differentiate their characteristics.

- Aerial Viaduct
- Berm or Mechanically Stabilized Earth (MSE)
- At-Grade (Existing Caltrain Grade)
- Open Trench
- Covered Trench/Tunnel
- Deep Tunnel

Table S-1 and figure S-2 present the alternatives preliminarily identified to be carried forward for further engineering and environmental analysis. Additional outreach will occur as these preliminary recommendations are finalized and

carried forward into further environmental and engineering analysis. It is important to understand that while some sub-sections carry multiple design options it is not always possible to connect two vertical options from one sub-section to another (tunnel to aerial viaduct for example). In some cases communities on the corridor will need to “share” an alternative. The transitions from one vertical solution to another takes approximately 3,000’ or just over half a mile so “quick” adjustments between vertical alternatives are not possible. These types of engineering realities will necessitate close cooperation between neighboring cities and communities, Caltrain and the Authority in developing appropriate solutions in these sub-sections and throughout the corridor.

Given the highly developed nature of the Caltrain corridor, the Authority, FRA and Caltrain have carried a wide range of vertical design options, where practical, from San Francisco to San Jose. No design options on the Caltrain corridor were eliminated from further consideration due to cost alone. This was in part because many individuals and communities on the corridor expressed a strong desire that alternatives be carried forward until there was a thorough analysis and discussion of the costs, environmental impacts, and engineering issues of the different vertical options. The other primary reason is that in order to develop an appropriate and logical cost estimate, all of the 10 sub-sections of the Caltrain corridor need to be “stitched” together into a cohesive system from San Francisco to San Jose. This exercise will be part of the 15% design study which is currently underway. Context sensitive solutions will also be incorporated in this effort. Once these corridor-wide alternatives are developed, they will be described on an engineering, environmental and cost basis. These corridor-wide alternatives can then become the basis for discussion of cost sharing between the Authority, FRA and other agencies including cities on the corridor.

The Preliminary Alternatives Analysis report shows that if alternatives from San Francisco to San Jose were created from the most costly design options put together, the costs could be between four to five times what has been accounted for in the Business Plan or other previous estimates. Such high cost alternatives would be impracticable.

**Table S-1  
Alternatives Carried Forward**

| Sub-section | Location   | Alternatives Carried Forward |      |          |             |                       |             |
|-------------|--|------------------------------|------|----------|-------------|-----------------------|-------------|
|             |  | Aerial Viaduct               | Berm | At Grade | Open Trench | Covered Trench/Tunnel | Deep Tunnel |
| 0(a)        | HST and Caltrain to both Transbay and 4 <sup>th</sup> & King                   |                              |      |          |             | ✓                     |             |
| 0(b)        | HST and Caltrain to Transbay, Caltrain to 4 <sup>th</sup> & King               |                              |      |          |             |                       |             |
| 0(c)        | HST to 4 <sup>th</sup> & King, Caltrain to Transbay and 4 <sup>th</sup> & King |                              |      |          |             |                       |             |
| 0(d)        | HST and Caltrain to both Beale Street and 4 <sup>th</sup> & King               |                              |      |          |             |                       |             |
| 1A          | North of Mission Bay Drive to South of 16 <sup>th</sup> Street                 |                              |      | ✓        |             | ✓                     |             |
| 1B-1C       | South of 16 <sup>th</sup> Street to North of Cesar Chavez Street               |                              |      | ✓        |             | ✓                     |             |
| 1D-1G       | North of Cesar Chavez Street to South Portal Tunnel No. 4                      |                              |      | ✓        |             | ✓                     |             |
| 2A          | South Portal Tunnel No. 4 to south of Colma Creek                              |                              |      | ✓        |             |                       |             |
| 2B          | South of Colma Creek to south of I-380   |                              | ✓    |          |             |                       |             |
| 2C          | South of I-380 to south of Center Street                                       | ✓                            | ✓    | ✓        | HST Only    | HST Only              |             |
| 2D          | South of Center Street to south of Millbrae Avenue                             |                              |      | ✓        | HST Only    | HST Only              |             |
| 3A          | South of Millbrae Avenue to south of Mills Creek                               | ✓                            |      | ✓        | ✓           | ✓                     |             |
| 3B          | South of Mills Creek to north of Villa Terrace                                 | ✓                            |      |          | ✓           | ✓                     |             |
| 3C-3D       | North of Villa Terrace to north of Hayward Park Station                        | ✓                            |      |          | ✓           | ✓                     |             |
| 3E          | North of Hayward Park Station to north of Highway 92                           |                              |      | ✓        |             |                       |             |
| 4A          | North of Highway 92 to south of 25 <sup>th</sup> Avenue                        |                              | ✓    |          |             |                       |             |
| 4B          | South of 25 <sup>th</sup> Avenue to south of Cordilleras Creek                 | ✓                            | ✓    | ✓        |             | ✓                     | HST Only    |

| Sub-section | Location  | Alternatives Carried Forward |      |               |             |                       |             |
|-------------|---|------------------------------|------|---------------|-------------|-----------------------|-------------|
|             |   | Aerial Viaduct               | Berm | At Grade      | Open Trench | Covered Trench/Tunnel | Deep Tunnel |
| 4C          | South of Cordilleras Creek to north of Woodside Road                            | ✓                            |      |               | ✓           | ✓                     | HST Only    |
| 4D          | North of Woodside Road to north of 5 <sup>th</sup> Avenue                       | HST Only                     |      | Caltrain Only | HST Only    | HST Only              | HST Only    |
| 5A          | North of 5 <sup>th</sup> Avenue to south of 5 <sup>th</sup> Avenue              |                              |      | ✓             |             |                       | HST Only    |
| 5B          | South of 5 <sup>th</sup> Avenue to south of Ravenswood Avenue                   | ✓                            |      | ✓             | ✓           | ✓                     | HST Only    |
| 5C          | South of Ravenswood Avenue to north of San Mateo County/Santa Clara County Line |                              |      | ✓             |             | ✓                     | HST Only    |
| 6A          | North of San Mateo County/Santa Clara County Line to south of Embarcadero Road  | ✓                            |      | ✓             |             | ✓                     | HST Only    |
| 6B          | South of Embarcadero Road to south of Churchill Avenue                          | ✓                            |      | ✓             | ✓           | ✓                     | HST Only    |
| 6C          | South of Churchill Avenue to north of East Meadow Drive                         | ✓                            |      | ✓             | ✓           | ✓                     | HST Only    |
| 6D          | North of East Meadow Drive to north of Adobe Creek                              | ✓                            |      | ✓             | ✓           | ✓                     | HST Only    |
| 7A-7B       | North of Adobe Creek to north of Stevens Creek                                  | ✓                            |      | ✓             | ✓           | ✓                     |             |
| 7C-7D       | North of Stevens Creek to north of Fair Oaks Avenue                             | ✓                            |      | ✓             | ✓           | ✓                     |             |
| 8A          | North of Fair Oaks Avenue to south of Scott Boulevard                           |                              |      | ✓             |             |                       |             |
| 8B          | South of Scott Boulevard to north of De La Cruz Boulevard                       | HST Only                     |      | HST Only      |             | HST Only              | HST Only    |
| 9(a)A       | North of De La Cruz Boulevard to South of Taylor Street                         | HST Only                     |      | HST Only      |             | HST Only              | HST Only    |
| 9(a)B       | South of Taylor Street to Diridon Station                                       | HST Only                     |      |               |             |                       |             |
| 9(b)A       | North of De La Cruz Boulevard to South of Taylor Street                         |                              |      |               |             |                       | HST Only    |
| 9(b)B       | South Taylor Street to Diridon Station  |                              |      |               |             |                       | HST Only    |

## **S.2 Next Steps**

This Preliminary Alternatives Analysis report informs the Project Description for the EIR/EIS. It also sets parameters for the next level of design (15%) and environmental analysis. This on-going work will provide the Authority, FRA, Caltrain and the communities on the corridor more details and a fuller picture of the both the design options in each sub-section and a comprehensive vision of the entire corridor.

Detailed operations studies will be performed for combining the Caltrain and HST scheduled operations for the corridor so that the design and the phasing of the construction of the project will inform the feasibility of the various vertical alternatives.

As the engineering and environmental work continues, the CHSRA and Caltrain will continue to meet and engage the cities on the corridor in a discussion about the different alternatives. If deemed necessary by the lead agencies, a supplemental Alternative Analysis report will consider feedback received on this Preliminary Alternative Analysis report and will discuss how the alternatives analysis will inform the detailed engineering, environmental and outreach activities on the Caltrain Corridor. These activities will inform preparation of the draft EIR/EIS, which is currently scheduled for public comment in December of 2010.